

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

5 Title: ASSIST ROD AND BASKET ASSEMBLY
Serial No.: 10/697,855
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First Named Inventor: Click
Group Art Unit: 3617
Examiner: Le, Mark T
10 Attorney Docket No.: PS5035P40-D

To: Commissioner for Patents
 United States Patent and Trademark Office

15

APPLICANT'S APPEAL BRIEF

20 **REAL PARTY IN INTEREST**

VAE Nortrak North America Inc.
1740 Pacific Avenue
Cheyenne, Wyoming 82001
25 USA

RELATED APPEALS AND INTERFERENCES

None

30

STATUS OF CLAIMS

Claims 1 – 9 stand rejected and are the subject of this appeal.

35 **STATUS OF AMENDMENTS**

No amendments have been filed subsequent to final rejection.

SUMMARY OF INVENTION/CLAIMED SUBJECT MATTER

The following general description precedes a discussion of the claim limitations.

- 5 This invention relates to assist rod assemblies, comprising front and rear baskets, for throwing railway switch points. The baskets of the invention play a dual role, taking up lost motion and actuating the assist rod.
- 10 The front basket includes an upwardly extending head portion adapted to link to a torsional assist rod and to rotate the assist rod when the basket undergoes lateral movement (transverse to the running rails) as a result of the switch being thrown.
- 15 The head of the basket comprises a bore for receiving a pin for rotation in the bore. A pair of link arms extend from the ends of the pin. The link arms engage the assist rod to cause it to rotate when the basket undergoes lateral movement transverse to the assist rod. The assist rod is separately mounted for rotation in a sleeve on a support clip. A threaded connector rod slidably extends through the basket. Movement of the basket in relation to the connector rod is limited by nuts threaded onto the rod at each end of the
- 20 basket. Adjustment of the nuts serves to adjust the amount of lost motion to be taken up by the basket before actuating the connector rod by abutment of the basket with the nuts.

Claim 1 in issue reads:

- 25 Claim 1. A railroad switch (Figs. 3-12) comprising:
a lost motion basket housing (Page 6, Line 35 to Page 7, Line 5; Figs 6-8; 106)
having an opening in said housing, said opening travelling laterally through said

housing, along a longitudinal axis, for allowing unimpeded lateral displacement of a rod or bar (Page 6, Line 35 to Page 7, Line 5; Figs 6-8, 102) therethrough;

5 at least one abutment (Page 6, Line 35 to Page 7, Line 5; Figs 6-8; 108, 110) in said opening for limiting lateral displacement through said opening of a surface associated with said rod or bar; and,

means (Page 7, Lines 6-14; Fig. 4;122, 126) for rotatably retaining an arm associated with said housing, said means having an axis of rotation;

10 wherein said axis of rotation does not intersect said longitudinal axis.

Claim 1 therefore defines a lost motion basket housing including retention means, the means further defined by the following limitations:

- 15
- retains an arm – limitation (a); and
 - rotatable retention of the arm – limitation (b).

20 Claims 2 – 4 depend from claim 1 and are found in the Claims Appendix.

Claim 5 addresses the embodiment of the invention with a distinct head portion and reads:

25 Claim 5. A railroad switch comprising:

a lost motion basket housing (Page 6, Line 35 to Page 7, Line 5; Figs. 6-8; 106) having an opening travelling laterally therethrough for allowing unimpeded lateral displacement of a rod or bar (Page 6, Line 35 to Page 7, Line 5; Figs. 6-8; 102)

therethrough along an opening axis, at least one abutment (Page 6, Line 35 to Page 37, Line 5; Figs. 6-8; 108, 110) in said opening for limiting lateral displacement through said opening of a surface associated with said rod or bar member and a head portion, and a bore (Page 7, Lines 32-39; Fig. 10; 140) in said head portion, said bore having an axis that is transverse to and does not intersect said opening axis, said bore receiving a pin (Page 7, Lines 32-39; Fig. 10; 142; 144) for rotation therein.

5 Claim 5 therefore defines a lost motion basket housing including a head portion and a bore in the head portion, the bore further defined by the limitation that it receives a pin for rotation therein – limitation (a).

10 Claims 6 – 9 depend from claim 5 and are found in the Claims Appendix.

15

ISSUES - GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 – 6, 8/5 and 8/6 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent No. 1,795,413 to Stiles (“Stiles”).

20 Claims 7, 8/7 and 9 were rejected under 35 USC 103(a) as being unpatentable over Stiles in view of U.S. Patent No. 2,077,620 to Dicke (“Dicke”).

25

GROUPING OF CLAIMS

GROUP A: Claims 1 – 4.

GROUP B: Claims 5, 6, 8/5 and 8/6.

30

GROUP C: Claims 7 and 8/7.

GROUP D: Claim 9. The examiner included specific comments for this claim.

ARGUMENT

5 The majority of the examiner's rejections are based on Stiles, a copy of which is included in its entirety in the Cited Art Appendix.

10 Stiles describes a throw rod connector for a railway track switch, by which the movement of a switch machine is converted to movement of a switch point. The object of Stiles' invention is to provide a connector which is protected against contamination or interference from foreign materials, without interfering with the operation of the switch (see Stiles, p.1, lines 21 – 32). Stiles discloses an internal structure similar to many other prior art baskets. However, Stiles' external structure is minimal and does not disclose or
15 contemplate the features of the present invention.

According to Stiles, the throw rod (2) is connected to tie bar (1) at one end, and to a switch machine or similar device at the other end (p. 1, lines 45 – 50). Specifically, the tie bar and throw rod are connected by means of a bracket member 5 "fixedly attached" 20 to the tie bar (p.1, lines 56 – 58) or "rigidly connected to the tie bar" (p.2 lines 25 – 26). The attachment is illustrated as being made via a series of bolts (23) inserted through openings (22) in an extension (21) of the bracket, as best seen in Fig. 1. Movement of the throw rod under the force of a switch machine takes place strictly along the rod's longitudinal axis. The bracket, being rigidly connected to the tie bar, forces the tie bar to 25 move parallel to and directly along with the bracket once the abutments (nuts 8) contact the inner abutment surfaces (10) of the bracket.

The specific limitations of the claims not met by Stiles will now be discussed in more detail, in which argument proceeds by groups of claims which will rely on common
30 argument for all claims of each group.

GROUP A

This group consists of claim 1 and its dependent claims 2 – 4. The arguments will be
5 directed to claim 1 but apply equally to the other dependent claims listed in this group.

The examiner claimed to be able to read all elements of claim 1 on Stiles as follows.
The following numbering refers to elements labeled in Stiles as asserted by the examiner.

10 Claim 1. A railroad switch comprising:

a lost motion basket housing (comprising head portion 21 and lower portion 5)
having an opening (7) in said housing, said opening travelling laterally through
said housing, along a longitudinal axis, for allowing unimpeded lateral
15 displacement of a rod or bar (2) therethrough;

at least one abutment (10) in said opening for limiting lateral displacement
through said opening of a surface (9) associated with said rod or bar; and,

20 means (bore 22) for rotatably retaining an arm (tie bar 1) associated with said
housing, said means having an axis of rotation;

wherein said axis of rotation does not intersect said longitudinal axis.

25 As noted earlier, the claim defines a lost motion basket housing including retention
means, the means further defined by the following limitations:

- rotatably retains an arm – limitation (a);

- having an axis of rotation which does not intersect the longitudinal axis of the opening in the housing – limitation (b).

The limitations identifying the arm rotatably retained by the housing are significant. In
5 citing and relying on Stiles to reject claim 1 and its depending claims, the examiner appears to misinterpret the interaction of several elements of Stiles in relation to the retention means defined by claim 1.

We turn to discuss more specifically the limitations of claim 1 that are not taught by
10 Stiles.

1. Limitation (a) – “rotatably retaining an arm”

Limitation (a) requires that the basket housing rotatably retain an arm, distinct from the
15 rod or bar which passes through the housing.

Limitation (a) requires that the arm be rotatably retained in a bore in the housing. The examiner contends that Stiles' tie bar 1 is an arm rotatably retained by the extension 21 of the bracket 5, thereby satisfying that limitation.

20 As the examiner indicated, the use of a single bore 22 and bolt 23 would not prevent rotation of the housing about an axis of rotation through the bore 23. However, Stiles clearly indicates that the housing is “fixedly attached to the tie bar” 1 through bracket member 5 (page 1, lines 56-58). Stiles further discusses this connection on page 2 at lines 25-31, stating that “the bracket member has been described as being rigidly connected to the tie-bar”. Stiles then discusses using bolts 23 to secure the bracket 5 to the tie-bar. The term “rigid attachment” therefore precludes rotation or other movement of the bracket once it is attached to the tie-bar. The technical reasons for requiring a rigid attachment in Stiles are obvious: as rod 2 moves laterally, housing 5 moves

laterally once the nuts 8 abut sleeves 14. The point of the fixed and rigid connection between the housing and the tie-bar is to move the tie-bar in the same lateral direction, with an essentially direct and parallel translation between the throw of the switch machine and movement of the switch rods. In contrast, the housing of the instant application contains means to translate lateral motion of the switch machine into rotational or torsional motion of the assist rods to the heel and front end switch rods of the switch. This is claimed in claim 1 as "means to rotatably retain an arm associated with the housing". The invention as claimed therefore performs a function that the invention disclosed by Stiles does not disclose and which would not be contemplated in 10 the context of the Stiles invention.

Further, even if the housing disclosed by Stiles were attached by a single bolt through a single bore, the lateral orientation and movement of rod 2 inside the housing would actually prevent rotation of the housing. Rod 2 is capable only of movement in a straight 15 line; rod 2 is contained snugly within bracket 5 so bracket 5 is likewise only capable of movement in an identical straight line. In contrast, the means through which the associated arm is rotatably retained in the present application is through pin 120, which is forced to rotate because of the lateral movement of the rod. The arrangement disclosed by Stiles is therefore not capable of rotation, as asserted by the examiner.

20

The examiner's assertion that limitation (a) reads on Stiles is unfounded.

2. Limitation (b) – "having an axis of rotation which does not intersect the
25 longitudinal axis of the opening in the housing"

As Stiles' tie bar 1 is clearly not made to rotate, does not define an axis of rotation.

Summary comments for claim 1

The foregoing shows that on two points relating to means by which an arm is rotatably retained in the basket housing, which elements of the invention are defined, Stiles fails to anticipate claim 1.

As Stiles also expressly teaches away from the rotatable retention of an arm in a portion of the basket housing of the present invention which allows proper directional movement 10 of assist rods connected to the housing, the invention is also not obvious in view of Stiles and it represents a substantial contribution to the art.

It is submitted that claim 1 patentably distinguishes with Stiles.

15 **GROUP B**

This group consists of claims 5, 6, 8/5 and 8/6. The arguments will be directed to claim 5 but apply equally to the other dependent claims listed in this group. Claim 5 claims a basket housing with a distinct head portion containing a bore, into which a pin is 20 received for rotation.

The examiner claimed to be able to read all elements of claim 5 on Stiles as follows. The following numbering refers to elements labeled in Stiles as asserted by the examiner.

25

Claim 5. A railroad switch comprising:

a lost motion basket housing having an opening travelling laterally therethrough for allowing unimpeded lateral displacement of a rod or bar therethrough along an

opening axis, at least one abutment (10) in said opening for limiting lateral displacement through said opening of a surface (9) associated with said rod or bar member (2) and a head portion (21), and a bore (22) in said head portion, said bore having an axis that is transverse to and does not intersect said opening axis, 5 said bore receiving a pin (bolt 23) for rotation therein.

As noted earlier, claim 5 defines a lost motion basket housing including a head portion and a bore in the head portion, the bore further defined by the limitation that it receives a pin for rotation therein – “limitation (a)”.

10 The limitation identifying the pin being received in the bore for rotation therein is significant in relation to the examiner’s objections. In citing and relying on Stiles to reject claim 5 and its depending claims, the examiner appears to misinterpret the interaction of several elements of Stiles in relation to the bore in the housing defined by 15 claim 5.

We turn to discuss more specifically the limitation of claim 5 that is not taught by Stiles.

20 Limitation (a) requires that the pin be received by a bore in the housing for rotation in the bore.

The use of a single bore 22 and bolt 23 would not prevent rotation of the housing about an axis of rotation through the bore 23. However, Stiles clearly indicates that the housing is “fixedly attached to the tie bar” 1 through bracket member 5 (page 1, lines 56-25 58). Stiles further discusses this connection on page 2 at lines 25-31, stating that “the bracket member has been described as being rigidly connected to the tie-bar”. The term “rigid attachment” therefore precludes rotation or other movement of the pin once it is placed into the extension 21 and tie bar 1. The rigid attachment in Stiles is necessary to proper functioning of the throw rod connector. Rod 2 must force the tie bar 1, through

the extension 21 and bracket 5, to move laterally, in direct correlation to the movement of the rod. Again, the point of the fixed and rigid connection between the housing and the tie-bar is to move the tie-bar in the same lateral direction, with an essentially direct and parallel translation between the throw of the switch machine and movement of the
5 switch rods. In contrast, the housing of the instant application contains means to translate lateral motion of the switch machine into rotational or torsional motion of the assist rods to the heel and front end switch rods of the switch. This is claimed in claim 5 as "a bore receiving a pin for rotation". Stiles' pin (bolt 23) is not intended to rotate – it is intended to firmly, rigidly connect extension 21 to tie bar 1, such that lateral
10 movement of the extension is properly translated to lateral movement of the tie bar.

In contrast, the present invention discloses a pin which is forced to rotate because of the movement of the throw rod, and therefore translates the lateral movement of the throw rod into rotational movement. The invention as claimed therefore performs a function
15 that the invention disclosed by Stiles does not disclose and which would not be contemplated in the context of the Stiles invention.

The examiner's assertion that limitation (a) reads on Stiles is unfounded.

20

Summary comments for claim 5

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The foregoing shows that on the means by which a pin is retained within a bore in the head portion of the basket housing, which elements of the invention are defined, Stiles fails to anticipate claim 5.

As Stiles expressly teaches away from the rotatable retention of a pin in the basket housing of the present invention which allows proper directional movement of assist rods connected to the housing, the invention is also not obvious in view of Stiles and it represents a substantial contribution to the art.

5

It is submitted that claim 5 patentably distinguishes with Stiles.

Claims 6, 8/5 and 8/6

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Claim 6 depends from claim 5, and further recites at least one torsion arm retained on the pin. Claim 8 recites attachment points on the housing to secure a switch rod assembly to the housing.

- 15 Stiles does not disclose or discuss a torsion bar, and particularly does not disclose a torsion bar retained on the pin. Figure 3 best shows the bolt 23, which the examiner has asserted is the "pin" claimed in claim 5. The bolt 23 is clearly shown as retaining only the bracket member 5 and the tie bar 1. The tie bar 1 would not be understood to comprise a torsion bar, which is, as would be understood by a person skilled in the art, intended to actuate rotation of other elements of the switch. The tie bar 1 is intended solely to connect the ends of the switch points, as stated at page 1, lines 45ff, and to ensure that they move in unison. Stiles does not disclose a torsion bar retained by the pin, nor is there in fact a torsion bar elsewhere in the arrangement described.
- 20
- 25 The examiner's assertion that claim 6 reads on Stiles is unfounded.

The examiner has also asserted that claim 8 as it depends from claim 5 and claim 6 is anticipated by Stiles. Claim 8 contains the additional limitation of "attachment points on

said housing for securing a switch rod assembly thereto". Stiles does not appear to have any means to attach other assemblies to bracket member 5.

5 Summary comments for claims 6, 8/5 and 8/6

The foregoing shows that on provision of or retention of a torsion bar on a pin retained within a bore in the head portion of the basket housing, which elements of the invention are defined, Stiles fails to anticipate claim 6.

10

As Stiles does not disclose the elements of claim 5 or claim 6, claim 8/5 and 8/6 cannot be anticipated by Stiles. In addition, the elements defined in claim 8 are not of themselves disclosed by Stiles. The examiner's assertion that claim 8/5 and 8/6 read on Stiles is unfounded.

15

It is submitted that claim 6, 8/5 and 8/5 patentably distinguish with Stiles.

GROUP C

This group consists of claims 7 and 8/7. Claim 7 depends from claim 6, and further recites a torsion arm with an elongated slot, through which the rotatable pin extends.

- 5 Claim 8/7 recites attachment points on the housing to secure a switch rod assembly. Both are ultimately dependent on claim 5.

The arguments set out above for Group B are reiterated for this group insofar as the claims depend on claim 5 and claim 6.

- 10 The examiner has taken the position that it would have been obvious to use the elongated slots disclosed by Dicke to modify the connection between Stiles' tie bar 1 and head member 21 to facilitate adjustability. However, it is submitted that such an action would in fact not be obvious simply because the use of such slots would be unnecessary and
15 redundant. Any adjustability of the bracket member 5 in relation to the switch machine is provided by adjustment of the abutments about throw rod 2. Additional movement caused by elongated slots, rather than the small openings 22 shown in Stiles Fig. 2, would render the throw rod less effective, as it would be more difficult to predict exactly how much extra movement is happening each time the switch machine moves the throw
20 rod.

The examiner's assertion that claim 7 reads on Stiles is unfounded.

- 25 The examiner has also asserted that claim 8 as it depends from claim 7 is anticipated by Stiles. Claim 8 contains the additional limitation of "attachment points on said housing for securing a switch rod assembly thereto". Stiles does not appear to have any means to attach other assemblies to bracket member 5.

It is submitted that the features claimed in claims 7 and 8/7 are therefore non-obvious over Stiles in view of Dicke.

5 **GROUP D**

This group consists of claim 9. This claim is ultimately dependent on claim 5 and is directed to the torsion rod recited in intervening claim 6, further reciting that one end of the torsion rod is rigidly secured to an assist rod.

10 The arguments set out above for Group B are reiterated for this group insofar as the claim depends on claims 5 and 6.

The examiner has taken the position that rods 11 of Dicke are readable as assist rods.
15 However, Dicke clearly shows and describes elements 11 as brackets which are simply used to make a connection between the operating rods 9, 10 and the switch points 7, 8. As rods 9, 10 extend out underneath the points 7, 8 and under rails 5, it is difficult to simply connect the operating rods to the switch points. The brackets 11 are not in fact readable as assist rods, as asserted by the examiner.

20 It is submitted that the claimed feature is therefore non-obvious over Stiles in view of Dicke.

For all of the foregoing reasons, it is respectfully submitted that the claims as currently
25 presented are allowable and that the examiner erred in rejecting them on the basis of Stiles or Stiles in view of Dicke.

Date: May 17, 2006

Respectfully submitted,

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Attorney acting in a representative capacity
pursuant to 37 CFR 1.34
Michael Glenn, Reg. No. 30,176

CLAIMS APPENDIX

1. A railroad switch comprising:

5 a lost motion basket housing having an opening in said housing, said opening travelling laterally through said housing, along a longitudinal axis, for allowing unimpeded lateral displacement of a rod or bar therethrough;

10 at least one abutment in said opening for limiting lateral displacement through said opening of a surface associated with said rod or bar; and,

means for rotatably retaining an arm associated with said housing, said means having an axis of rotation;

15 wherein said axis of rotation does not intersect said longitudinal axis.

2. The railroad switch of claim 1, said housing further comprising a head portion and a lower portion, said means for rotatably retaining an arm being located on said head portion.

20 3. The railroad switch of claim 2 wherein said means for rotatably retaining an arm comprises a bore in said head portion, said bore being transverse in relation to said opening and being adapted to receive a pin for rotation in said bore and for connection to said arm.

25 4. The railroad switch of claim 3 wherein said lower portion comprises means for securing a rod to said housing.

5. A railroad switch comprising:

a lost motion basket housing having an opening travelling laterally therethrough for allowing unimpeded lateral displacement of a rod or bar therethrough along an opening axis, at least one abutment in said opening for limiting lateral displacement through said opening of a surface associated with said rod or bar member and a head portion, and a bore in said head portion, said bore having an axis that is transverse to and does not intersect said opening axis, said bore receiving a pin for rotation therein.

- 5
- 10 6. The railroad switch of claim 5 further comprising at least one torsion arm retained on said pin.
7. The railroad switch of claim 6 wherein said torsion arm comprises an elongated slot and one end of said pin extends through said elongated slot.
- 15 8. The railroad switch of claims 5, 6, or 7 further comprising attachment points on said housing for securing a switch rod assembly thereto.
- 20 9. The railroad switch of claim 6 or 7 wherein one end of said torsion arm is rigidly secured to an assist rod.

EVIDENCE APPENDIX

None

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RELATED PROCEEDINGS APPENDIX

None

CITED ART APPENDIX

U.S. Patent No. 1,795,413 to Stiles.

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U.S. Patent No. 2,077,620 to Dicke.

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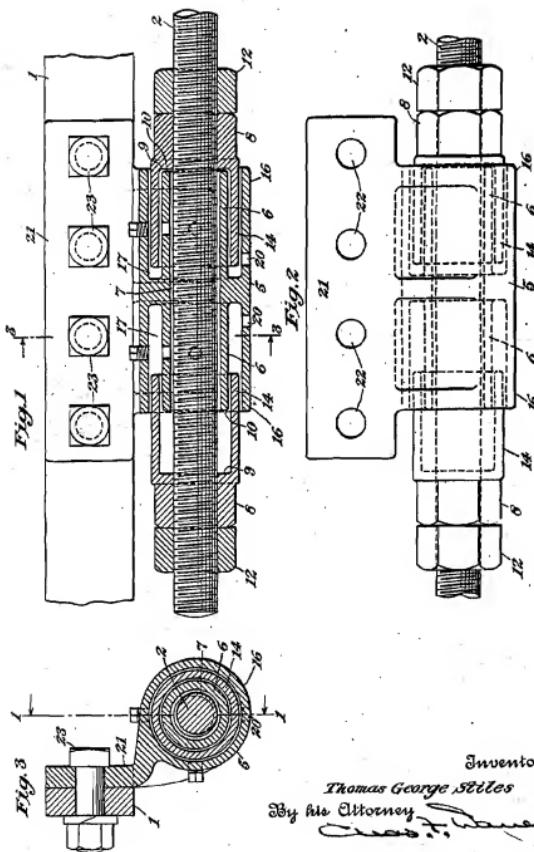
March 10, 1931.

T. G. STILES

1,795,413

SWITCH THROW ROD CONNECTION

Filed June 19, 1930



Inventor

Thomas George Stiles
By his Attorney 

UNITED STATES PATENT OFFICE

THOMAS GEORGE STYLES, OF ARLINGTON, NEW JERSEY

SWITCH THROW-ROD CONNECTION

Application filed June 19, 1930. Serial No. 462,182.

The invention relates to switch throw-rod connections for railway track switches.

In the operation of switches, the throw of the switch lever is usually greater than the necessary throw of the switch to open or closed position, and, therefore, means are usually provided to compensate for such difference. Such means usually comprises an adjustable connection between the throw-rod and the tie-bar of the switch points, which connection includes one or more abutments adjustably mounted on the throw-rod and a cooperating member on the tie-rod with which the abutments engage to shift the switch, the latter member usually being so formed as to partially house the abutting parts for the purpose of protecting them from snow, sleet and other foreign material which might interfere with their proper adjustment and operation.

A great deal of trouble has been experienced, however, in providing a means for effectively protecting this adjustable throw-rod connection against the accumulation of snow, sleet and other foreign material, without at the same time interfering with its proper operation and adjustment. It has therefore been the object of my invention to provide an improved throw-rod connection of the type in question that will be effectively housed without impairment in any way to its normal operation and adjustment. This object I attain by means of the novel construction and combinations of parts constituting my invention as hereinabove described and claimed and as illustrated in the accompanying drawings, in which—

Fig. 1 is a front elevation and section of a throw-rod connection embodying my invention, with the section taken on the line 1—1 of Fig. 2 longitudinally of the connection.

Fig. 2 is an elevation of the same; and

Fig. 3 is a vertical cross section taken on the line 3—3 of Fig. 1.

To explain in detail, 1 indicates a section of a tie-bar which connects at its opposite ends with the points of a switch in usual manner, and 2 indicates the threaded end of a throw-rod which, at its opposite end, connects with a lever or other switch operating device. As

the connection of the tie-bar with the switch points and the connection of the throw-rod with its operating means, are or may be of usual construction, no detailed description or illustration of the same is necessary herein.

The means for adjustably connecting the throw-rod with the tie-bar comprise a bracket member 5 fixedly attached to the tie-bar and having at its opposite ends tubular extensions 6, 6 with a communicating opening 7 or passage 7 between the same, through which tubular extensions and communicating passage the threaded end of the throw-rod loosely extends.

Mounted on the throw-rod for engagement with the ends of the bracket extensions 6, 6 are abutments, in the form of nuts 8, 8. As the throw-rod is shifted longitudinally from the switch stand or tower, the inner face 9 of either one of these nuts, according to the direction of movement of the rod, is brought into engagement with the end 10 of the adjacent bracket extension to shift the switch either to its open or closed position, the relative movement between the throw-rod and the bracket member, such as will compensate for the difference in throw between the switch and its operating lever, being determined by the adjustment of the nuts on the throw-rod relatively to the abutting ends 10 of the bracket extensions, as will be readily understood. After the nuts 8 have been adjusted, they may be secured in adjusted position by any suitable means, such as the lock nuts 12.

As a means for protecting this adjustable sliding connection between the throw-rod and tie-bar from the accumulation of foreign material, particularly snow and ice, such as might interfere with its ready and proper operation and adjustment, I have provided the nuts 8, 8 with sleeve extensions 14, 14 at their inner ends which fit over and have a sliding telescopic connection with the adjacent tubular extensions 6, 6 of the bracket members. With this construction, that is, the sleeves 14, 14 fitting over and enclosing the ends of the bracket extensions 6, 6, the opening in the bracket member through which the throw-rod extends and also the spaces between the abutting faces 9 and 10,

are effectively closed against the accumulation of foreign materials, such as described, which might tend to jam or otherwise interfere with the normal operation of the parts.

- 5 The construction as thus far described is effective to protect the parts under normal conditions, but as an additional means of protection, I prefer to provide the bracket member 5 with tubular portions 16, 16 concentric with the tubular extension 6, 6 and spaced therefrom, as at 17, to receive and overlie the sleeves 14, 14 carried by the nuts on the throw-rod. With these tubular portions 16 overlying the ends of the sleeves 14, 14 and the sleeves in turn overlying the ends of the inner bracket extensions 6, it will be clear that the opportunity for any snow, sleet or other foreign material working into the connection where it may jam or otherwise 20 interfere with the proper working of the parts is practically nil. Any water leaking into the connection will discharge by gravity through outlet opening 20 in the lower part of the bracket member.

- 25 The bracket member has been described as being rigidly connected to the tie-bar. This connection may be effected in any desired way. As here shown, the bracket is formed with an extension 21 having openings 22 through which extend bolts 23 for detachably securing the bracket to the tie-bar.

What I claim is:

1. A throw-rod connection comprising a bracket member having tubular extensions at its opposite ends and a communicating opening between the same, a throw-rod extending loosely through said extensions and communicating opening, and abutment members on said rod for engagement with the opposite ends of the bracket extensions and having projecting sleeves receiving and enclosing the ends of said extensions.

2. A throw-rod connection comprising a bracket member having tubular extensions at its opposite ends and a communicating opening between the same, a screw threaded throw-rod extending loosely through said extensions and communicating opening, and nuts threaded on said rod for engagement with the opposite ends of the bracket extensions, said nuts having projecting sleeves receiving and enclosing the ends of said bracket extensions.

3. A throw-rod connection comprising a bracket member having tubular extensions at its opposite ends and a communicating opening between the same, a throw-rod extending loosely through said extensions and communicating opening, and abutment members on said rod for engagement with the opposite ends of the bracket extensions and having projecting sleeves receiving and enclosing the ends of said extensions, said bracket member also having at its opposite ends tubular portions concentric with its said tubular exten-

sions which receive and enclose the ends of the projecting sleeves on the abutment members.

4. A throw-rod connection comprising a bracket member having tubular extensions at its opposite ends and a communicating opening between the same, a screw threaded throw-rod extending loosely through said extensions and communicating opening, and nuts threaded on said rod for engagement with the opposite ends of the bracket extensions and having projecting sleeves receiving and enclosing the ends of said bracket extensions, said bracket member also having at its opposite ends tubular portions concentric with its said tubular extensions which receive and enclose the ends of the projecting sleeves on the said nuts.

In testimony whereof I affix my signature.

THOMAS GEORGE STILES.

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April 20, 1937.

O. H. DICKE

2,077,620

ADJUSTABLE CONNECTING MEANS

Filed Aug. 29, 1934

FIG. 1.

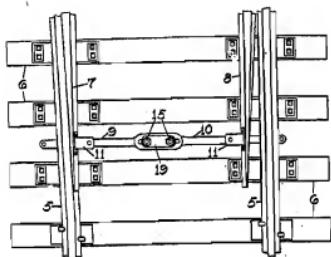


FIG. 4.

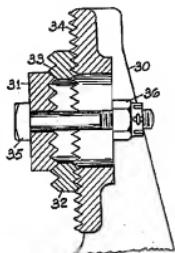


FIG. 2.

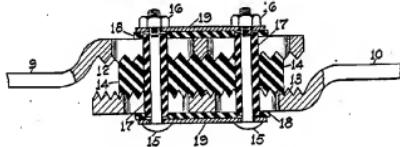
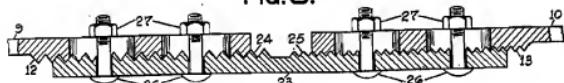


FIG. 3.



INVENTOR
Oscar H. Dicke,
BY *Neil D. Preston,*
HIS ATTORNEY

UNITED STATES PATENT OFFICE

2,077,620

ADJUSTABLE CONNECTING MEANS

Oscar H. Dickey, Rochester, N. Y., assignor to General Railway Signal Company, Rochester, N. Y.

Application August 29, 1934, Serial No. 741,952

5 Claims. (CL 246—450)

This invention relates to adjustable connecting means, and more particularly to a means for securely interconnecting parts of railway devices which permits an accurate relative adjustment of the parts.

In interconnecting the movable points of a railway track switch and in mounting various devices on railway vehicles and the like, mechanical connections must be provided which can withstand considerable tensile forces, and yet such connections must permit one member to be adjusted very accurately relative to the other at various times to compensate for wear or other changing conditions affecting the spacing of the members. The relatively movable members of such adjustable connections must then be provided with some gripping means such as interfitting teeth, or the like, in order to prevent slipping when subjected to large tensile forces, and inasmuch as these interfitting teeth necessarily graduate the increments of adjustment, a very accurate adjustment can only be permitted by very fine and closely spaced teeth which then become so weak that they are ineffective to resist large tensile forces.

In view of the above and other considerations, it is an object of the present invention to provide a mechanical connecting means so arranged that the parts thereof are prevented from slipping by interfitting means of very rugged construction, and yet which permit an extremely fine adjustment of the relative positions of the members connected thereby. Another object of the present invention is to incorporate a means whereby the parts which are thus adjustably connected may also be electrically insulated, and yet retain the advantages of the extremely fine adjustment and the ability to withstand severe tensile forces.

The present invention accomplishes the foregoing and other objects by a connecting means having two sets of interfitting-tooth connections which are arranged in series or tandem to interconnect the parts to be adjustably joined, with the teeth in one set differently spaced than the teeth of the other set, so that the increments of adjustment of the relative position of the joined parts are not graduated merely by the spacing of the teeth of any one set, but rather in accordance with the difference between the spacing of the teeth of the two sets, which difference may then be made as small as necessary to permit the required accuracy of adjustment without sacrificing the mechanical strength of the 55 teeth. This novel connecting means constitutes,

in fact, a differential or vernier connecting device.

The novel features which are considered characteristic of the present invention are set forth in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments, when read in connection with the accompanying drawing, in which:

Fig. 1 is a plan view illustrating an application of the present invention to the front rod of a railway track switch.

Fig. 2 is an enlarged sectional view of one form of the present invention which may be used in Fig. 1.

Fig. 3 is an enlarged sectional view of a modified form of the present invention which may also be used in Fig. 1.

Fig. 4 is a sectional view illustrating the manner of mounting a car-carried receiving means used in railway train control systems, also in accordance with the present invention.

In Fig. 1 of the accompanying drawing, a section of track rails 5 carried on usual ties 6 is shown as having switch points 7 and 8 movable relative to the rails 5, to thus constitute a railway track switch. It will be obvious that in such a track switch, these switch points 7 and 8 must be rigidly interconnected to permit a suitable manual or power-operating means, not shown herein, to move the points 7 and 8 in unison toward and away from the associated rails 5, and to securely hold the points in position against vibration and stress imposed thereon by a passing train. It is also necessary to accurately adjust the spacing between the switch points 7 and 8, so that when the switch point operating means is in one position, the point 7 is positioned against one rail, and when the operating means is moved to the other position, the point 8 is moved into position against the other rail.

Consequently, the end portions of the movable points are provided with suitable interconnecting operating rods 9 and 10 respectively attached to the switch points 7 and 8 by brackets 11, the ends of the operating rods 9 and 10 extending outwardly beneath the rails 5, whereby to attach the switch operating means. The inner ends of these rods 9 and 10 are shown in Fig. 1 as overlapping and adjustably connected in accordance with the embodiment of the present invention shown in Fig. 2.

The inner ends of the rods 8 and 18 are preferably enlarged as shown in Fig. 1 and these ends may be slightly offset in opposite directions to overlap as shown in Fig. 2. The lower surface of the enlarged end of rod 8 is provided with transverse teeth 12, and the upper surface of the enlarged end of the rod 18 is also provided with transverse teeth 18, but as may be seen in Fig. 2, the teeth 12 are slightly more widely spaced than teeth 18. An insulating connecting block 14 of fibre, hard rubber, bakelite or other suitable insulating material, is provided between the overlapping enlarged ends of rods 8 and 18, which block 14 is provided with transverse teeth on its upper surface spaced to interfit with the teeth 12 of rod 8, and is also provided with transverse teeth on its lower surface spaced to interfit with teeth 18 of rod 18.

Two bolts 16 pass through holes in the block 14 and through elongated slots in the enlarged ends of both rods 8 and 18, and by tightening nuts 18 threaded on the bolts 16, the rods 8 and 18 may be securely clamped to opposite sides of the block 14, whereby a sturdy connection is made between the rods 8 and 18 through the interfitting arrangement of the teeth 12 and 18 with the block 14. In order to prevent the bolts 16 from electrically connecting the rods 8 and 18, insulating sleeves 17 are provided on the body portions of the bolts 16, and insulating strips 18 separate the nuts 18 and the heads of bolts 16 from the respective rods 8 and 18. In order to prevent damaging the insulating strips 18 by turning the nuts 18 or heads of bolts 16, metal spacing strips 19 may be employed as shown in Fig. 2.

The spacing of the switch points 7 and 8 may now be adjusted by removing or releasing nut 18, and moving either rod 8 or 18 in the proper direction one or more tooth-spaces on the block 14 are thereby permitted by the elongated slots in the rods 8 and 18. But, however, if a change in spacing is required which is shorter than the spacing of the closer teeth 12, the rods 8 and 18 may be moved in opposite directions on the block 14, whereby the resulting change in the spacing of the switch points 7 and 8 will be the difference between the linear spacing of teeth 12 and 18, multiplied by the number of teeth each rod is thus moved. Or, considering merely for illustration that the teeth 12 are linearly spaced $\frac{1}{2}$ inch and the teeth 18 are spaced $\frac{3}{4}$ inch, a change of $\frac{1}{4}$ inch in the spacing of the switch points 7 and 8 could be produced by moving each of the rods 8 and 18 one tooth-space. In opposite directions on the block 14, likewise a change of $\frac{1}{4}$ inch should be produced by moving the rods 8 and 18 two tooth-spaces in this manner, and of course, a change of $\frac{3}{4}$ inch and $\frac{1}{2}$ inch could be obtained by respectively moving rods 8 and 18 alone one tooth-spaces.

In the form shown in Fig. 2, the block 14 could be made of a suitable metal instead of insulating material in applications wherein it is not necessary to electrically insulate the switch points, and in this case the sleeves 17 and strips 18 could obviously be eliminated.

In the modified arrangement of the adjustable switch-point connecting means shown in Fig. 3, the enlarged ends of the rods 8 and 18 do not overlap, but rather the inner ends are slightly spaced and connected by a link 23. The teeth 12 and 18 are now formed on the lower side of the respective rods 8 and 18, and these teeth match and interfit with teeth 24 and 26 on the upper surface of the associated ends of the link 23.

Four bolts 28 extend through holes in the link 23 and through elongated slots in the enlarged ends of the rods 8 and 18, whereby the rods 8 and 18 are securely clamped on the respective ends of the link 23 by nuts 27 threaded on the bolts 28.

In Fig. 3, the linear spacing between the teeth 12 and 24 is also slightly longer than the spacing between the teeth 18 and 26, and consequently when the nuts 27 are released, the minimum change in the spacing between the switch points 7 and 8, which may be obtained by moving the rods 8 and 18 in opposite directions on the link 23, is the difference between the linear spacing of the teeth 12 and 18, and obviously the same increments of adjustment in the spacing of the switch points 7 and 8 are possible with the form shown in Fig. 3 as previously described in connection with the form shown in Fig. 2.

In Fig. 4 of the accompanying drawing, a method of adjustably mounting a train control receiver upon a railway vehicle is shown, and in order to simplify the drawing, the train control receiver has not been shown in detail, but may be of the type disclosed in Patent No. 1,710,855 granted to C. S. Bushnell on April 23, 1929. The member 31 in Fig. 4 represents one of two upwardly extending arms of the receiver housing, whereby the receiver is mounted on brackets extending horizontally from the journal box of a railway vehicle, which brackets have been represented by member 32.

A metallic block 33 is interposed between the bracket member 31 and the arm member 38, the bracket 31 and one side of the block 33 having interfitting teeth 33, while the other side of the block 33 and the arm 38 have interfitting teeth 34 which are slightly finer or spaced slightly closer than the teeth 33. A bolt 36 passes through a hole in the bracket 31 and through elongated slots in both the block 33 and arm 38, whereby the teeth 33 and 34 are clamped in interfitting relationship by a nut 35 threaded on the bolt 36.

In such train control systems, the receiver must be mounted to pass within rather accurately spaced relation to cooperating trackway devices, and by mounting the receiver in this manner the nuts 35 may be released and the arm 38 may be moved one tooth-space in one direction upon the block 33 while the block 33 together with the arm 38 may then be moved one tooth-space in the other direction on the bracket 31, thereby raising or lowering the receiver relative to the bracket 31 only the difference between the spacing of teeth 33 and 34. In other words, in the arrangement shown in Fig. 4, various combinations of movements of the arm 38 and the block 33 result in a vertical movement of the receiver upon the railway vehicle in rather small increments determined by the difference in the spacings between teeth 33 and 34.

From the foregoing description of the various embodiments of the present invention, it will be obvious that slipping of the connected parts is prevented by interfitting teeth, or the like, which teeth necessarily graduate the adjustment of one member relative to the other, but by the provision of two sets of such interfitting teeth, which are in tandem and have a slight difference in the spacing of teeth, a much finer overall adjustment has been made possible than is permitted by the spacing of any one set of teeth. The obvious advantages of this arrangement are that the interfitting teeth of each set may then be as deep and widely spaced as is necessary to be with-

stand the forces to which they are subjected, and yet the graduated increments of adjustment may be as minute as desired, inasmuch as the factor determining the size of such increments is the difference between the spacing of the two sets of interfitting teeth.

The above rather specific description of the selected forms of the present invention has been given solely by the way of example, and is not intended, in any manner whatsoever, in a limiting sense. It is also to be understood that various modifications, adaptations, and alterations may be applied to meet the requirements of practice, without departing from the spirit or scope of the present invention, except as limited by the appended claims.

Having described my invention, I now claim:—

1. In an adjustable connection for railway switch rails, inwardly extending overlapping rods connected to the rails, a connecting block between the overlapping portions of the rods, a first series of transverse interfitting teeth connecting one rod to one side of the connecting block, a second series of transverse interfitting teeth connecting the other rod to the other side of the connecting block, the first series of teeth being differently spaced than the second series of teeth, and means for clamping the rods in various positions on opposite sides of the connecting block.
2. In an adjustment for railway switch rails, inwardly extending rods connected to the rails, a connecting member having a series of transverse teeth interfitting with teeth on one rod and a differently spaced series of transverse teeth interfitting with teeth on the other rod, and means for clamping the rods in various positions on the connecting member.

3. In an adjustable connection for railway switch points, inwardly extending rods connected to each switch point, a connecting member adjustably clamped to an inner end of each rod, and spaced transverse teeth on each rod interfitting with teeth on the connecting member, the teeth on one rod being differently spaced than the teeth on the other rod, whereby to permit an adjustment in the spacing of the switch points in accordance with said difference in spacing of teeth.

4. An adjustment for railway switch rails, inwardly extending rods connected to the rails, an electrical insulating member having a series of transverse teeth interfitting with teeth on one rod and also having a differently spaced series of transverse teeth interfitting with teeth on the other rod, and electrical insulating means operable to clamp the rods in various positions on the electrical insulating member.

5. In an adjustable connection for railway switch rails, inwardly extending overlapping rods connected to the rails, a connecting block of insulating material positioned between the overlapping portions of the rods, a first series of transverse interfitting teeth connecting one rod to one side of the connecting block, a second series of transverse interfitting teeth connecting the other rod to the other side of the connecting block, the first series of teeth being differently spaced than the second series of teeth, and means for clamping the rods in various positions on opposite sides of the connecting block.

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